

Parents' Adverse Childhood Experiences and Their Children's Behavioral Health Problems

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abstract

BACKGROUND AND OBJECTIVES: Adverse childhood experiences (ACEs) include stressful and potentially traumatic events associated with higher risk of long-term behavioral problems and chronic illnesses. Whether parents' ACE counts (an index of standard ACEs) confer intergenerational risk to their children's behavioral health is unknown. In this study, we estimate the risk of child behavioral problems as a function of parent ACE counts.

METHODS: We obtained retrospective information on 9 ACEs self-reported by parents and parent reports of their children's (1) behavioral problems (using the Behavior Problems Index [BPI]), (2) attention-deficit/hyperactivity disorder diagnosis, and (3) emotional disturbance diagnosis from the 2013 Panel Study of Income Dynamics (PSID) core interview and the linked PSID Childhood Retrospective Circumstances Study and 2014 PSID Child Development Supplement. Multivariate linear and logistic regression models were used to estimate child behavioral health outcomes by parent retrospective ACE count.

RESULTS: Children of parents with a history of 4 or more ACEs had on average a 2.3-point (95% confidence interval [CI]: 1.3–3.2) higher score on the BPI, 2.1 times (95% CI: 1.1–3.8) higher odds of hyperactivity, and 4.2 times (95% CI: 1.7–10.8) higher odds of an emotional disturbance diagnosis than children of parents with no ACEs. Maternal ACEs revealed a stronger association with child behavior problems than paternal ACEs. Relationships between parents' 9 component ACEs individually and children's BPI scores revealed consistently positive associations. Mediation by parent emotional distress and aggravation were observed.

CONCLUSIONS: Parents with greater exposure to ACEs are more likely to have children with behavioral health problems.



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WHAT'S KNOWN ON THIS SUBJECT: We can use adverse childhood experiences (ACEs) to predict early life behavioral problems and adult chronic illness risk and severity across the life span. Intergenerational associations between parents' ACEs and their children's behavioral health problems have not been quantified.

WHAT THIS STUDY ADDS: Children of parents reporting more ACEs bear higher burden of behavioral health problems and conditions, including attention-deficit/hyperactivity disorder and emotional disturbance diagnoses.

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Adverse childhood experiences (ACEs) include abuse, neglect, and household dysfunction experienced before the age of 18, and ACEs have well-established downstream health consequences over the life course. Higher ACE scores help us to predict behavioral health problems in childhood and adulthood, worsening mental health, adverse health-related behaviors, chronic disease burden, and premature mortality.¹⁻³ Little published evidence, however, exists regarding intergenerational associations between ACE scores in parents and behavioral health in their children.

Although specific parental adverse experiences, such as abuse in childhood, have been associated with children's socioemotional problems and risk of maltreatment,⁴⁻⁸ intergenerational associations between more global parent ACE counts and children's behavioral health problems remain largely unexamined. If various types of childhood adversity cause harm through a common set of stress pathways, as is commonly hypothesized, then parent ACE count might reflect the total "dose" across types of adversity better than any specific ACE. Moreover, intergenerational effects of ACEs might be transmitted through common pathways such as parent mental health and unfavorable parenting practices.⁹⁻¹¹ Authors of a single domestic study used maternal ACEs to predict infant and early childhood developmental outcomes¹² and the authors of 2 Canadian studies have shown that maternal total ACE counts predict mothers' perceptions of infants' emotional problems and, separately, development,^{13,14} but researchers have not examined such relationships throughout childhood.

The ACE count bundles together multiple risk factors in the domains of abuse, neglect, and household dysfunction and may serve as a more comprehensive index of parental

adversity experienced during their childhood. Estimates of the intergenerational behavioral health risk to children of their parents' ACE counts could provide insight into how childhood adversity and adult health hazards are transmitted in families and help clinicians more accurately anticipate and decrease the risk of child behavioral health problems.

In our study, we examine differences in indices of children's behavior problems and the risk of behavioral health conditions (attention-deficit/hyperactivity disorder [ADHD] and any mental health disturbance) associated with their parents' retrospective ACE counts in a national sample of families. We explore separate parent-specific associations between the mothers' and fathers' ACE counts and their children's behavioral problems, as well as potential mediators of these associations including parental mental health and parenting aggravation.

METHODS

Design and Participants

We used data from the 2013 wave of the Panel Study of Income Dynamics (PSID), a panel survey with a genealogical design in which researchers collect household economic, health, and demographic information by telephone from a nationally representative sample of US adults, spouses or partners, and their children. Child behavioral outcomes and parents' ACE data were obtained from two 2014 PSID supplements: the Child Development Supplement (CDS) 2014 and the Childhood Retrospective Circumstances Study (CRCS). All 5636 children aged 0 to 17 in PSID households were eligible for CDS 2014, for which information was collected via telephone and in-person on children's behavior, psychological and social well-being, family environment, education, and

caregiver characteristics between the fall of 2014 and the spring of 2015. Of the eligible children, 4333 (77%) contributed any data after the families of 881 children could not be reached within the data collection period, 391 refused or had language barriers, and 31 were excluded for other reasons. Of the children whose behavioral outcomes were collected, those with any parent reporting information on all ACEs assessed by CRCS were included in our study. The researchers of the CRCS retrospectively assessed 9 ACEs for English-speaking adults and their spouses or partners from the PSID 2013 main interview. A total of 8072 individuals completed the CRCS via a Web-based or mailed survey between May 2014 and January 2015 for an unweighted response rate of 62% (weighted response rate 67%) that was similar to the Web-based supplements in other national panel studies.¹⁵ Among the 4333 CDS 2014 children, 67% had either a mother or a father who participated in the CRCS, yielding 2903 children who were eligible for our study. Our main study group thus comprised children participating in CDS 2014 with 1 or more parents reporting complete ACE data in the CRCS, which we analyzed to answer the following primary study question: What is the association between parents' ACEs and their children's behavioral health problems?

Construction of ACE Predictor

Parents participating in the CRCS reported any experiences before age 18 of physical abuse, emotional abuse, sexual abuse or assault, emotional neglect, witnessing intimate partner violence at home, witnessing household substance use, having a parent with mental illness, any parental separation or divorce, and/or having a deceased or estranged parent. In Table 1, we display the proportion with each type of ACE and the distribution of

TABLE 1 ACE Category Descriptions, Proportion of Adult Sample With Each ACE, and Proportion of Sample by ACE Count in the PSID CRCS (Overall, 2014–2015, *n* = 7223)

ACE Category	Description Based on ACE Survey Item	Weighted Percentage Positive, %
ACE type		
Emotional abuse	The combination of the respondent rating their relationship as poor with their mother and/or father and indicating that the relationship involved the highest degree of emotional tension	3
Physical abuse	Whether the mother and/or father sometimes or often slapped, threw things at, or otherwise physically harmed the respondent	23.1
Sexual abuse	Whether the respondent reported being the victim of a crime classified as assault or rape in childhood	3.6
Intimate partner violence	Whether the respondent reported that his or her mother and father often, sometimes, or infrequently pushed, threw things at, or were otherwise physically harmful toward one another	20.8
Household substance abuse	Whether the respondent reported that his or her mother and/or father abused drugs or alcohol	19.5
Mental illness in household	Whether the respondent reported if his or her mother and/or father had any mental health problems (eg, panic attacks and depression)	21.4
Parental separation or divorce	Whether the respondent reported if his or her parents were separated or divorced	27
Emotional neglect	Whether the respondent reported that his or her mother or father displayed no affection or parenting effort	7.2
Deceased or absent parent	Whether the respondent reported that his or her mother or father was deceased or unknown to him or her at a time in the childhood of the respondent	5
ACE count		
0 ACEs	—	36.4
1 ACE	—	27.5
2 ACEs	—	15.9
3 ACEs	—	9.7
4 ACEs	—	5.4
5 ACEs	—	3.4
6 ACEs	—	1.1
7 ACEs	—	0.5
8 ACEs	—	0.1
9 ACEs	—	0.0

—, not applicable.

participant ACE counts. Consistent with previous literature, ACE counts were binned into 4 categories: 0, 1, 2 to 3, and 4+.^{16–18}

For our main analysis, the parent ACE predictor variable was specified as the higher of either parent’s ACE count category, allowing for inclusion of children with only 1 parent who participated in the CRCS. For analyses in which the relationship between each parent’s ACE count and child behavioral outcomes were examined, we included the ACE count of each parent (if present) in the model along with an indicator variable for the presence of each parent. We examined specific parent ACE predictors one by one and counted them positive if either parent had experienced the specific ACE.

Given this is the first published use of ACEs from the PSID, we confirmed

retrospective ACEs were associated with current adult health outcomes, measures of those adults’ childhood stress, and their home environment (Supplemental Information).

Outcomes

Outcomes included the Behavior Problems Index (BPI), a 30-item battery used to assess the incidence and severity of child behavior problems.^{19,20} The BPI was administered to the primary caregivers of children aged 3 to 17 in CDS 2014. Response options for all BPI items included never, sometimes, and often, which were dichotomized to never (0) or sometimes or often (1) and summed for a total BPI score for each child. Primary validation of the BPI from the 1981 National Health Interview Survey Child Health Supplement revealed high internal reliability with an α of .91.

The researchers of that validation study reported a mean of 6.4 points and an SD of 5.7. To benchmark the index, they also reported children who had previously needed psychiatric treatment having BPI scores roughly 1 SD greater than population average.²¹ Internalizing and externalizing behavior BPI subscales were provided from the PSID (Supplemental Table 6).²²

The 10-item CDS 2014 Positive Behavior Scale (PBS) measured positive behaviors such as self-control, persistence, self-esteem, social competence, and compliance in children aged 6 to 11.²³ The PBS score is the average of its 10 component items (shortened for the CDS from the usual 25 items), which ask primary caregivers to respond on a 5-point scale from “not at all like your child” (0) to “totally like your child” (5) (Supplemental

Table 7). The PBS has an adequate internal consistency ($\alpha .79$), moderate stability over time, and high construct validity with inverse correlations between the PBS and BPI between -0.48 (parent rated) and -0.8 (teacher rated) in previous CDS waves.

Two clinical outcomes included primary caregiver report of the child ever having been told by a clinician that he or she had 1) ADHD or 2) any mental illness or emotional disturbance.

Covariates

The PSID main interview and CDS 2014 provided data for the following covariates in our analyses: an education variable for each parent (less than high school, high school graduate or General Equivalency Diploma, some college, completed college, and graduate degree), child age in years, child race (white, African American, Asian American and/or Pacific Islander, and multiracial or other), an indicator for child Latino and/or Hispanic ethnicity, household income ($<100\%$, $100\%–199\%$, $200\%–299\%$, $300\%–399\%$, and $\geq 400\%$ of the federal poverty level), an indicator of family health insurance, count variables for the number of household members and children, and indicators of the presence of each parent. Results were nearly identical when a covariate for reasons single-parent households had <2 parents (ie, divorce, parent death, etc) was added, so it was not included.

We examined demographic differences between the subsample of children with complete data and the overall CDS 2014 sample. We chose not to use multiple imputation to address data missingness and instead excluded observations with incomplete data because we hypothesized that the primary cause of missingness (parents not participating in the Web-based CRCS) was not random and, if anything,

would likely bias our findings toward the null.

To ensure that our main regression findings were adequately free from selection bias in supplemental analyses, we used treatment effects models with inverse probability of treatment weighting and regression adjustment.²⁴ We estimated the probability of treatment (parent ACE count category) using data reported by the parents in the sample on their own parents' (ie, their children's grandparents) education levels, their self-rated socioeconomic status in childhood, their race and ethnicity, and childhood family structure. The covariates used in the main regression analyses were also used in these doubly robust treatment effects models as regression adjustment covariates.

Statistical Analyses

We regressed children's behavioral outcomes on their parents' ACE counts by using multivariate linear and logistic regression models adjusted for covariates. Models were weighted to accommodate the complex survey design, achieve population representation, and adjust for nonresponse. We calculated and report survey-robust SEs.

We performed secondary analyses to assess whether relationships between parent ACE counts and behavioral health outcomes were mediated by parents' mental illness (using the Kessler-6 scale of emotional distress) or aggravation (using the Aggravation in Parenting Scale [APS]). Both scales have strong psychometric properties and are well validated.^{25,26} We performed formal Goodman and Gotlib⁵ tests (a well-validated approach) to determine the degree of reduction in the coefficient on continuous outcome variables after accounting for a mediator to estimate the proportion of the ACE count effect on BPI and PBS scores mediated by their anxiety and depression symptoms or

aggravation parents experienced in their parenting roles.²⁷ In additional secondary analyses, we ran separate linear regression analyses for each of the 9 parent ACEs coded as binary predictor variables against child behavioral outcomes.

We also examined parent-rated overall child health status and odds of obesity by using the parent ACE count predictor to determine if adversity tracked with other aspects of children's health. The null results (Supplemental Table 8) of these analyses confirmed children's behavioral health outcomes were distinctly associated with parent childhood adversity.

All analyses were conducted by using Stata, version 14 (Stata Corp, College Station, TX). The University of California, Los Angeles Institutional Review Board approved this study, in which we used restricted data from University of Michigan's Institute for Social Research.

RESULTS

Of the 2903 CDS 2014 children whose parents participated in CRCS, our sample included 2529 children with complete data. One-fifth of children had a parent who reported experiencing 4 or more ACEs during their own childhood. Over 20% of our sample was nonwhite, one-eighth was Latino or Hispanic, one-fourth had parents with a high school education or less, one-eighth lived below the federal poverty line, and the average age was 9 years. The average scores on the BPI and PBS were 6.8 (SD 5.8) and 4.1 (SD 0.5), respectively. ADHD was reported for 8% of children, and $<4\%$ of children were reported to have been given a diagnosis of emotional disturbance (Table 2).

Children who had a parent with a history of 4 or more ACEs had worse scores on the BPI and PBS, as well as on the internalizing and externalizing

TABLE 2 Sample Characteristics: Children in 2014 PSID CDS With ≥ 1 Parent Having an ACE Score From the 2014 CRCS

Characteristics	Weighted Percentage or Mean (SD) for Final Sample (n = 2529)	Weighted Percentage or Mean (SD) for Overall CDS 2014 Sample (n = 4203)
Child race		
White	78.03	72.13
African American	12.14	14.46
Asian American and/or Pacific Islander	3.00	3.45
Other	6.83	9.97
Child ethnicity		
Latino and/or Hispanic	13.63	20.50
Household health insurance		
Insured	88.89	82.17
Primary caregiver's education		
Less than high school	7.14	13.38
High school graduate and/or GED	17.39	20.86
Any college and/or vocational school	27.02	28.29
College graduate	27.26	21.01
Graduate school	21.18	16.39
Child age in y	9.33 y (SD 4.43)	9.26 y (SD 4.57)
Household income level, % FPL		
>400	39.64	32.20
300–400	13.84	12.61
200–299	19.04	20.07
100–199	15.83	20.06
<100	11.65	15.05
No. ACEs in parent with highest count		
0	20.73	—
1	30.05	—
2–3	31.92	—
4 or more	17.31	—
Hyperactivity diagnosis	8.36	8.66
Emotional disturbance diagnosis	3.60	3.69
BPI: total score	6.83 (SD 5.82)	6.91 (SD 5.93)
BPI: externalizing score	4.93 (SD 4.10)	4.97 (SD 4.14)
BPI: internalizing score	2.49 (SD 2.92)	2.53 (SD 2.96)
PBS score	4.13 (SD 0.53)	4.15 (SD 0.54)

FPL, federal poverty level; GED, General Equivalency Diploma; —, not applicable.

behavior subscales of the BPI, compared with children whose parents reported no ACEs during

their childhood (Table 3). Higher odds of hyperactivity and emotional disturbance were also observed for

children of parents with the highest ACE burden.

When we included the ACE count of each responding parent in our model, we found that high ACE counts for mothers were strongly associated with child behavior outcomes (Table 4). For children with mothers whose ACE counts were 4 or more, the adjusted odds ratios (aORs) for hyperactivity and emotional disturbance were 3.1 (95% confidence interval [CI]: 1.5–6.1) and 5.4 (95% CI: 1.9–15.1) compared with no maternal ACEs, whereas for children of fathers with 4 or more ACEs, the aORs were 1.3 (95% CI: 0.6–2.9) and 2.3 (95% CI: 0.7–7.7) compared with no paternal ACEs. Likewise, BPI scores were 2.3 (95% CI: 1.4–3.3) and 2.8 (95% CI: 1.6–3.9) points higher for children whose mothers reported, respectively, 2 to 3 and 4 or more ACEs compared with no maternal ACEs, whereas BPI scores were 1.1 (95% CI: 0.6–2.2) points higher for children of fathers with 2 to 3 more ACEs compared with no paternal ACEs.

When examining which component ACEs for parents were associated with increases in children's BPI scores, each ACE except neglect, exposure to intimate partner violence, and death or estrangement of a parent showed a statistically significant positive association (Table 5).

TABLE 3 Differences in Likelihood of Child Behavior Problems and Conditions by Higher of Either Parent's ACE Count

Child Behavioral Outcome Measure or Condition	Higher of Either Parent's ACE Count			
	0 ACEs	1 ACE	2–3 ACEs	4 or More ACEs
Behavioral conditions reported to parents by a clinician (aORs, n = 2564)				
Hyperactivity	Ref	1.44 (0.8 to 2.6)	1.42 (0.8 to 2.5)	2.07 (1.1 to 3.8) ^a
Emotional or mental disturbance	Ref	1.56 (0.6 to 4.1)	1.66 (0.6 to 4.3)	4.24 (1.7 to 10.8) ^b
Behavior scales (adjusted linear regression coefficients, n = 2316)				
BPI: total score	Ref	0.22 (–0.6 to 1.1)	1.83 (1.0 to 2.7) ^c	2.30 (1.3 to 3.2) ^c
BPI: externalizing behaviors score	Ref	0.40 (–0.2 to 1.0)	1.26 (0.6 to 1.9) ^c	1.46 (0.8 to 2.1) ^c
BPI: internalizing behaviors score	Ref	0.30 (–0.1 to 0.7)	0.95 (0.5 to 1.4) ^c	1.40 (0.8 to 1.9) ^c
PBS	Ref	–0.09 (–0.2 to 0.03)	–0.17 (–0.3 to –0.05) ^b	–0.26 (–0.4 to –0.1) ^c

^a Indicates significant difference from referent group with P value < .05.

^b Indicates significant difference from referent group with P value < .01.

^c Indicates significant difference from referent group with P value < .001.

TABLE 4 Differences in Likelihood of Child Behavior Problems and Conditions by Mothers' or Fathers' Individual ACE Counts

Child Behavioral Outcome Measure or Condition (<i>n</i> = 1979 Children With Data Available on All Parents' ACE Scores)	Mother's or Father's ACE Count			
	0 ACEs	1 ACE	2–3 ACEs	4 or More ACEs
Mothers' ACEs and children's behavioral outcomes				
Hyperactivity, aOR (95% CI)	Ref	1.85 (0.9 to 3.6)	1.62 (0.9 to 3.0)	3.10 (1.5 to 6.2) ^a
Emotional or mental disturbance, aOR (95% CI)	Ref	1.93 (0.7 to 5.4)	2.04 (0.8 to 5.5)	5.66 (2.0 to 15.9) ^a
BPI: total score, adjusted linear coefficient (95% CI)	Ref	0.50 (−0.4 to 1.4)	2.36 (1.4 to 3.3) ^b	2.77 (1.7 to 3.9) ^b
Fathers' ACEs and children's behavioral outcomes				
Hyperactivity, aOR (95% CI)	Ref	0.99 (0.5 to 1.9)	0.97 (0.5 to 2.0)	1.29 (0.6 to 2.9)
Emotional or mental disturbance, aOR (95% CI)	Ref	1.71 (0.5 to 5.7)	0.89 (0.2 to 3.2)	2.43 (0.7 to 8.1)
BPI: total score, adjusted linear coefficient (95% CI)	Ref	0.58 (−0.3 to 1.5)	1.09 (0.04 to 2.15) ^c	1.09 (−0.4 to 2.6)

^a Indicates significant difference from referent group with *P* value <.01.

^b Indicates significant difference from referent group with *P* value <.001.

^c Indicates significant difference from referent group with *P* value <.05.

TABLE 5 Associations Between Parents' Specific ACE and Children's BPI Scores

History of Specific ACE in Either Parent (<i>n</i> = 2397)	Average Increase in Total BPI Score When ACE Present in Either Parent (95% CI)
Divorce	1.06 points (0.40 to 1.73) ^a
Emotional abuse	1.49 points (0.80 to 2.18) ^b
Physical abuse	1.10 points (0.45 to 1.74) ^c
Sexual abuse	1.77 points (0.49 to 3.05) ^a
Neglect	0.54 points (−0.46 to 1.53)
Exposure to mental illness in household	1.39 points (0.74 to 2.04) ^a
Exposure to illicit substance use in household	1.28 points (0.59 to 1.96) ^b
Exposure to intimate partner violence in household	0.53 points (−0.14 to 1.19)
Death or estrangement of caregiver(s)	1.11 points (−0.14 to 2.36)

^a Indicates statistically significant result at $\alpha < .001$ threshold.

^b Indicates statistically significant result at $\alpha < .01$ threshold.

^c Indicates statistically significant result at $\alpha < .05$ threshold.

Goodman and Gotlib⁵ mediation analyses showed that 27.0% of the association between child BPI total score and parents' ACE count category was mediated by primary caregivers' Kessler-6 emotional distress scores, whereas 19.0% of the association was mediated by parents' scores on the APS. Accordingly, these parent mediators attenuated the associations between the higher of either parent's ACE count and children's behavioral outcomes when included in our primary regression models (Supplemental Table 9).

Analyses in which inverse probability of treatment weighting with regression adjustment was used were consistent with our primary analyses' findings, suggesting minimal selection bias (Supplemental Table 10).

DISCUSSION

In our study of a national sample of families, we found associations

between parents' ACE counts and their children's behavioral health problems. Higher parent ACE counts (particularly mothers' ACE counts) were associated with children's higher scores on validated measures of both internalizing and externalizing behavior problems (BPI), lower measures of positive behaviors (PBS), and increased odds of ADHD and emotional disturbance. Six of the 9 individual parent ACEs examined in our study were associated with statistically significant increases in child BPI scores.

This is the first report showing a relationship between overall parental ACE count and children's behavioral health diagnoses, which indicates that the impacts of elevated ACE counts on emotional well-being may extend across generations. These intergenerational correlations are partially mediated by parents' emotional distress and aggravation

with parenting. Our findings extend to ACEs more generally the results of existing studies in which a link has been shown between specific ACEs experienced by parents (eg, physical abuse) and behavioral outcomes in their children.^{4–8}

We found that mothers' ACE counts exerted a stronger influence on child behavioral outcomes than fathers' ACE counts. Mothers were predominantly the primary caregivers for children in our sample, which may explain the greater influence of their experience of adversity through more time spent with the child. There is also evidence from the child and adolescent development literature that mothers' and fathers' parenting tends to differ on standard dimensions of parenting style (authoritative, authoritarian, and permissive),²⁸ and that the differences in parenting styles correlate with differential emotional adjustment in teenagers.²⁹ This raises the possibility that parent ACEs may influence children's behavior through parenting styles more common among mothers. In utero maternal influences might be another mechanism through which maternal adversity in particular could affect child outcomes.³⁰ These mechanisms deserve additional study.

Our results reveal that parent ACE scores could help clinicians identify children early on who

are at higher risk for behavioral health problems and provide an opportunity to prevent downstream consequences associated with childhood behavioral health problems, such as higher risk of academic underachievement,³¹ involvement in the justice system,³² mental illness,³³ substance use,³⁴ and poorer attainment.³⁵ If these hazards to lifelong success can be traced back, even just in part, to parent ACEs, this could help clinicians target preventive interventions early in an at-risk child's life, perhaps by equipping parents with skills to promote their child's healthy emotional development before they are even born. Given the relative ease of collecting parent ACE information, we suggest exploring how parent ACE information might be collected for behavioral risk stratification in prenatal and early childhood clinical settings or for better understanding underlying familial risks after behavior problems are identified. Additional research is needed to evaluate prospectively the impact of screening for parents' ACEs and intervening to mitigate child behavioral health risk.

Our results revealed additional evidence that early childhood stresses have long-lasting downstream consequences across generations. Given that childhood behavior problems are linked to later life mental health and that intervention during the perinatal period has been suggested as a method to reduce adult mental illness burden,³⁶ our findings further support a growing literature on family-based, 2-generation approaches to mental illness treatment. Clinically validated and implemented approaches to preventing child maltreatment and

exposure to violence may represent strategies to not only minimize short-term harms to the child but also prevent behavior problems in future generations.³⁷

As in most studies measuring the long-term consequences of ACEs, we are limited in our study by relying on retrospective reports of ACEs. Reverse causality is a potential threat if behavior problems in children prompted parents to examine their upbringings through a lens of greater frustration, although it seems unlikely that parents would report ACEs that simply did not occur. Unmeasured confounding biological or behavioral factors in parents and children, ways parents relate to their children, or the interaction of these factors could play a role in linking the ACE predictors and child outcomes in our study. Resilience factors and childhood adversity that were not captured by our ACE measure were not addressed in this study, and this limits our ability to gauge the full dynamic effect of how adversity is experienced and responded to. Selection into the sample of children whose parents responded to CRCS may have disproportionately included or excluded children whose parents had a history of ACEs or other factors. Although we could not, authors of future studies should examine whether children's behavior problems related to their parents' ACEs predispose them to adult mental illness, risky behaviors, and lower achievement.

CONCLUSIONS

We found that child behavioral health problems are linked to higher ACE counts experienced by these children's parents, particularly by their mothers. This is the first study of American families to report

that overall parent ACE count is correlated with behavioral health problems in their children. Parent mental health and aggravation with parenting partially mediated the association between parent ACEs and child behavior. Efforts to reduce child behavior problems should consider risk stratification on parents' ACEs and upstream approaches to reducing ACEs or interrupting their intergenerational impacts.

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ABBREVIATIONS

ACE: adverse childhood experience
ADHD: attention-deficit/hyperactivity disorder
aOR: adjusted odds ratio
APS: Aggravation in Parenting Scale
BPI: Behavior Problems Index
CDS: Child Development Supplement
CI: confidence interval
CRCS: Childhood Retrospective Circumstances Study
PBS: Positive Behavior Scale
PSID: Panel Study of Income Dynamics

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